

National Spatial Data Infrastructure

Utilities Data Content Standard

**Facilities Working Group
Federal Geographic Data Committee**

February 1997

draft

Federal Geographic Data Committee

Department of Agriculture • Department of Commerce • Department of Defense • Department of Energy
Department of Housing and Urban Development • Department of the Interior • Department of State
Department of Transportation • Environmental Protection Agency
Federal Emergency Management Agency • Library of Congress
National Aeronautics and Space Administration • National Archives and Records Administration
Tennessee Valley Authority

Federal Geographic Data Committee

Established by Office of Management and Budget Circular A-16, the Federal Geographic Data Committee (FGDC) promotes the coordinated development, use, sharing, and dissemination of geographic data.

The FGDC is composed of representatives from the Departments of Agriculture, Commerce, Defense, Energy, Housing and Urban Development, the Interior, State, and Transportation; the Environmental Protection Agency; the Federal Emergency Management Agency; the Library of Congress; the National Aeronautics and Space Administration; the National Archives and Records Administration; and the Tennessee Valley Authority. Additional Federal agencies participate on FGDC subcommittees and working groups. The Department of the Interior chairs the committee.

FGDC subcommittees work on issues related to data categories coordinated under the circular. Subcommittees establish and implement standards for data content, quality, and transfer; encourage the exchange of information and the transfer of data; and organize the collection of geographic data to reduce duplication of effort. Working groups are established for issues that transcend data categories.

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Part One: Introduction

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1. DEFINITIONS

For the purpose of this Utilities Standard, the following definitions apply.

1.1 **entity class** - logical group of related entity types (e.g., grouping of water system components (entity types) such as water_hydrant, water_line, water_pump, water_reservoir, water_tank, ... into an water system entity class).

1.2 **entity type** - definition and description of a set (class of real world phenomena) into which similar entity instances are classified (e.g., water_reservoir).

1.3 **entity instance** - real-world spatial phenomenon about which data is collected, maintained, and disseminated. (e.g., the McMillan Water Reservoir). Entity instances are the geospatial objects that are graphically delineated in a spatial database.

1.4 **attribute** - a defined characteristic of an entity type (e.g., an attribute of electrical cable entity type = electrical cable material).

1.5 **domain** - a finite list (or range) of permissible values for a specified attribute. Included are tables of: units of measure, types, styles, status, names, methods, materials, dispositions, sources, dimensions, data, classes, etc. (e.g., electrical cable material --Al, Fe, Pb, steel, Cu, ...).

1.6 **attribute value** - a specific quality or quantity assigned to an attribute for a specific entity instance (e.g., electrical cable material = Cu).

1.7 **IDEF modeling** - Integrated Definition (IDEF) is the name given to a family of over 30 graphical modelling techniques. The IDEF₀ and IDEF_{1x} are the best known of these techniques. IDEF₀ techniques are used to describe business processes or activities for reengineering a function. IDEF_{1x} techniques are used to define business rules and create a logical data model.

1.8 **geospatial data** - data with implicit or explicit reference to a location relative to the earth.

1.9 **data content standard** - provides the semantic definitions for a set of real world spatial phenomena of significance to a community. Data Content Standards may be organized and presented in a specified logical data model such as an entity-relationship model or and IDEFIX model

1.10 **utilities** - a man-made components of a system that provides a service to the public.

2. PURPOSE, SCOPE, APPLICABILITY

2.1 PURPOSE

This Utilities Geospatial Data Content Standard (hereafter called Utilities Standard) is classified as a **Data Content Standard** in the Federal Geographic Data Committee (FGDC) Standards Reference Model. This Utilities Standard standardizes the names, definitions and domains for utility system components that can be geospatially depicted as entities and their non-graphical attributes..

2.2 SCOPE

This Utilities Standard supports large-scale, intracity applications such as engineering and life-cycle maintenance of utilities systems. The utility system components addresses in this standard include: electrical monitoring and control,

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electrical distribution, fuel distribution, industrial waste collection, natural gas distribution, storm drainage collection, wastewater collection, water, and heating and cooling. The components of each utility system described in this Utility Standard are located outside the foundation of a structure. The scope of this standard currently does not include: communications, alarm systems. At present this standard may not contain all the entity types necessary to model long distance utilities networks that stretch over long distances and between cities. This Standard uses a logical data model (described in section 3.) that is consistent with the Spatial Data Transfer Standard (SDTS).

2.3 APPLICABILITY

This Utilities Standard is applicable for any architectural, engineering, construction, and facilities management applications. This standard may also be applicable for other applications that captures or uses utilities systems information as geospatial data.

3. DEVELOPMENT AND MAINTENANCE

3.1 STANDARDS DEVELOPMENT PROCESS

This standard was developed by the Utilities project team under the guidance of the Facilities Working Group. Much of the utilities system information contained in this standard was extracted the Tri-Services Spatial Data Standards (TSSDS). The initial information from the TSSDS was reviewed and revised by the Utilities project team. The Utilities project team had participants from Federal agencies, professional societies, and local governments, and private industry. Specifically the following organizations were significantly involved in the development of this standard:

U.S. Army Corp of Engineers
American Public Works Association
Environmental Protection Agency
Applied Geographics, Inc.

Editors Note: *** Additional names of organizations that are represented on the project team and other significant contributing organizations to this standard shall be added to this list. *

3.2 RELATIONSHIP TO OTHER STANDARDS

As previously mentioned this Utilities Standard closely parallels the utilities information contained in the TSSDS.

****Editors Note:**** Are there other standards that need to be discussed here? (e.g., relationship to the FGDC Transportation Subcommittee's Data Content Standard for National Pipeline Data.)

3.3 MAINTENANCE

The Department of Defense, U.S. Army Corps of Engineers maintains the Utilities Data Standard for the Federal Geographic Data Committee with support from the Tri-Service CADD/GIS Technology Center. All general questions concerning this standard should be addressed to:

**U. S. Army Corps of Engineers
General Engineering Branch
20 Massachusetts Avenue, NW
Washington, DC 20314-1000**

All technical question pertaining to this standard should be directed to:

**Tri-Service CADD/GIS Technology Center
ATTN: CEWES-IM-DA
3909 Halls Ferry Road
Vickburg, MS 39180-6199**

4. PARTS OF THE STANDARD

This Utilities Standard consists of four parts. The Introduction, Part I of the Utilities Standard, defines the purpose of this standard, the process followed during its development, the organization(s) involved in its development and maintenance, and its relationship to other standards. Part II contains a comprehensive Entity Types report which lists the utilities entity type names and definitions, the object type, and their associated entity class and attribute table. Part III contains a comprehensive Attributes report which contains a complete listing of attributes tables associated with utilities entity types and each attributes names, definitions, data type, character length, and associated domain name. Part IIII contains a comprehensive Domains report which contains a complete listing of domain names (and their definitions) associated with utilities attributes and lists the values for each domain (and defines each value.)

Part I	Introduction
Part II	Utilities Entity Types
Part III	Utilities Attributes
Part IV	Utilities Domains
Annex A	Utilities Entity Relationship Model

(Editors Note: How do I include very large format ER models into this document?)

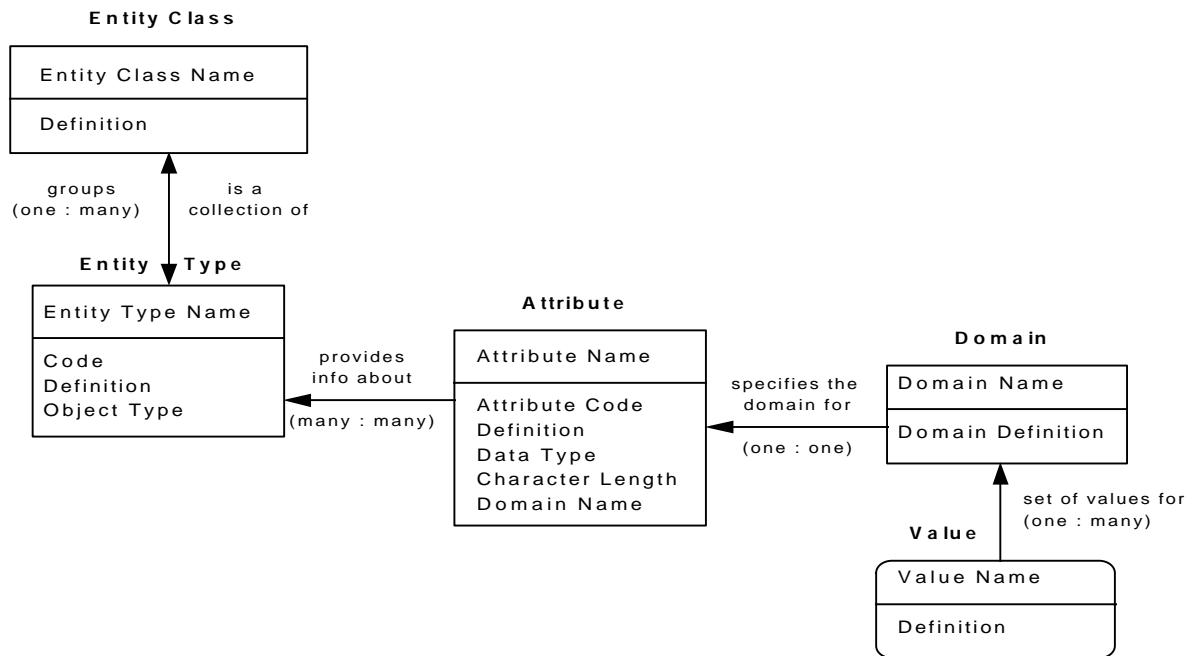
The Utilities Standard also contains an informative annex, Annex A, that contains a series of entity relationship models for this Utilities Standard.

5.0 ENTITY TYPE, ATTRIBUTE, DOMAIN LOGICAL DATA MODEL

Agreement on a common format is not sufficient to ensure that the geospatial information transferred is meaningful to both the sender and the receiver. In order to share spatial data (and as part of a SDTS data transfer process) a common data model must be defined and used. In addition, semantic content of a spatial database(i.e., the entities and associated attribute and attribute value information) must well defined and agreed upon by an application community and specified in either an off-line document (i.e. data content standard and/or in the metadata for a given database. Part 2 of the SDTS is a formal attempt to develop a standardized list of entities. Additionally application communities that want to share geospatial information are developing data content standards modeled after the SDTS data model.

This Utilities Standard is based upon the SDTS geospatial data model as presented in Parts 1 and 2 of that standard. The SDTS data model depicts the real world as consisting of entities characterized by attributes which are assigned attribute values. The Utility Standard defines utility system entity types and their attributes and specifies the domain (range or list) of attributes values. In addition, this standard incorporates several additional extensions to the SDTS data model including the concept of grouping utilities system components(entities) into entity classes and linking specific attributes to specific entity types.

Utilities Data Model



6. REFERENCES

Tri-Service CADD/GIS Technology Center (1996) "Tri-Service Spatial Data Standards," release 1.6.

Spatial Data Transfer Standard

Editors Note: Are there other references that should be listed here?*

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Part Two: Entity Types

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Appendix A: Entity Types

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Appendix B: Attributes

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Appendix C: Domains

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Appendix D: Entity Relationship Model

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